

EXHIBIT A

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF CALIFORNIA

Wave Neuroscience, Inc., a Delaware
corporation,
Plaintiff/Counterclaim Defendant,
v.
Peaklogic, Inc., a Delaware corporation;
and Kevin T. Murphy, M.D., a
Professional Corporation, doing business
as Mindset,
Defendants/Counterclaim Plaintiffs.

Case No.: 21cv1330-CAB-SBC

**ORDER ON MOTION FOR
SUMMARY JUDGMENT OF
INVALIDITY**

[Doc. No. 207]

Plaintiff Wave Neuroscience, Inc. (“Wave”) alleges that defendants Peaklogic, Inc. and Kevin Murphy, M.D. (hereafter jointly “Peaklogic”) infringe certain claims of U.S. Patents Nos. 8,475,354 (‘354 patent); 8,480,554 (‘554 patent); and 9,446,259 (‘259 patent). Peaklogic moves for summary judgment of invalidity contending all the asserted claims are directed to a natural phenomenon and not patentable subject matter under 35 U.S.C. § 101. [Doc. No. 207.] Wave filed an opposition. [Doc. No. 216.] Peaklogic filed a reply. [Doc. No. 227.] The Court held argument on September 3, 2024. For the reasons set forth at the hearing and discussed below, the motion is Granted in Part and Denied in Part.

1 The patents at issue are directed at devices ('354 patent) or methods ('259 and '554
2 patents) for generating a magnetic field and using that field to adjust the electrical activity
3 of a subject's brain from its intrinsic frequency to a pre-selected frequency.¹ The '259 and
4 '554 patents claim magnetic adjustment methods as treatments for mental disorders, such
5 as depression. The '354 patent claims a Transcranial Magnetic Stimulation (TMS) device
6 to generate the magnetic field and based on the subject's brain frequency measured using
7 electroencephalography (EEG) moving that frequency using repetitive firing of the
8 magnetic field to a pre-selected frequency.

9 Peaklogic contends that the asserted claims simply recite the natural phenomenon
10 that the brain's frequency will respond and adjust to external magnetic pulses, a normal
11 physiological response. Further, the claims employ well-understood, routine, and
12 conventional devices and methods to achieve this natural response and therefore provide
13 no patentable inventive concept.

14 **I. Legal Standard**

15 Summary judgment is appropriate when there is no genuine dispute as to any
16 material fact and the movant is entitled to judgment as a matter of law. Fed. R. Civ. P. 56.
17 At summary judgment, the evidence of the non-movant is to be believed, and all justifiable
18 inferences are to be drawn in his favor. *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 255
19 (1986).

20 "Whoever invents or discovers any new and useful process, machine, manufacture,
21 or composition of matter, or any new and useful improvement thereof, may obtain a patent
22 therefor, subject to the conditions and requires of this title." 35 U.S.C. § 101. This
23 statutory provision is subject to the judicially-created exclusion principle that "laws of
24 nature, natural phenomena, and abstract ideas" are not themselves eligible to be patented.
25 *Alice Corp. Pty. V. CLS Bank Int'l*, 573 U.S. 208, 216-17 (2014).

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28 ¹ The full text of the asserted claims of the patents at issue is attached as Appendix A to this order.

1 The court is directed to apply a two-step test for the determination of patent
2 eligibility. First, the court must evaluate whether the claims at issue are directed to one of
3 the patent ineligible concepts. *Id.* at 217. If so, the court proceeds to the second step and
4 evaluates whether the claim's elements, considered both individually and as an ordered
5 combination, transform the nature of the claim into a patent-eligible application. The
6 second step is referred to as the search for inventive concept. *Id.* at 217–18. The second
7 step is satisfied when the claim limitations involve more than performance of well
8 understood, routine, and conventional activities previously known to a person of skill in
9 the relevant field at the time the patent was filed. *Berkheimer v. HP, Inc.*, 881 F.3d 1360,
10 1367 (Fed. Cir. 2018). Whether the claim limitations are well understood, routine and
11 conventional activities is a question of fact. *Id.* at 1370.

12 **II. Claim 39 of the '354 Patent**

13 The only claim of the '354 patent asserted in this litigation is independent Claim 39.
14 Claim 39 is for a device, specifically a Transcranial Magnetic Stimulation (TMS) device
15 that uses an electromagnet to generate a magnetic field. By applying the magnetic field to
16 the subject, the electrical activity of the subject's brain, its intrinsic (i.e., natural) frequency,
17 can be altered or tuned. The claimed TMS device has a processor that controls repetitive
18 firing of the magnetic field, also known as Repetitive Transcranial Magnetic Stimulation
19 (rTMS). TMS devices and the application of a series of repetitive magnetic pulses (rTMS)
20 were known in the art at the time the patent was filed. [Doc. No. 18-1, '354 Patent,
21 Background of the Invention, Col. 1:20-25.]

22 The claim includes the limitation that the intrinsic frequency of a brain of a subject
23 be within a specified Electroencephalography (EEG) band and that a pre-selected different
24 frequency within that EEG band is determined prior to treatment. Wave acknowledged
25 that it did not invent the EEG and that the patents do not disclose or claim an improvement
26 in the functioning of the EEG to measure the electrical activity of the brain. Using the
27 repetitive firing of the magnetic field, the subject's intrinsic frequency is moved to the pre-
28 selected intrinsic frequency within the specified EEG band.

1 Peaklogic argues that this claim is directed at a natural phenomenon, that subjecting
2 a person's brain to a magnetic field will result in the electrical frequency of the brain being
3 altered to a different frequency. While it takes a human action, the administration of the
4 magnetic field to the subject's brain, the manifestation of that action—that the electrical
5 frequency of the brain will respond to the external magnetic field—is a natural process.
6 *See Mayo Collaborative Services v. Prometheus Labs, Inc.*, 566 U.S. 66, 77 (2013) (“[T]he
7 relation itself [between the external magnetic field and the brain's intrinsic frequency]
8 exists in principle apart from any human action.”). Peaklogic further contends that the
9 tools described in Claim 39 (a TMS device, rTMS, and EEG readings) employed to achieve
10 this natural phenomenon are routine applications of well known, conventional means and
11 do not transform the claim into patentable subject matter.

12 Wave counters that Claim 39 is not directed at the natural phenomenon of altering
13 the brain's intrinsic frequency by exposing it to a magnetic field. Rather Wave argues it is
14 directed at a new way to apply the TMS device to treat patients with brain disorders. Using
15 the natural phenomenon that the brain can be “tuned,” Wave contends the patent provides
16 “prescribed magnetic fields ... reciting specified brain biometric markers, and associated
17 personalized protocols to alter the patient's brain, specifically altering those biomarkers in
18 an individualized and targeted (pre-selected) manner.” [Doc. No. 216 at 22.] *See Vanda*
19 *Pharms. Inc. v. West-Ward Pharms., Int'l Ltd.*, 887 F.3d 1117, 1135 (Fed. Cir. 2018) (the
20 claim limitations of specific dosages were significant to finding a new way of using an
21 existing drug was not merely directed to a law of nature).

22 Although other unasserted claims of the '354 patent may include such treatment
23 specifics and personalized protocols directed at treating brain disorders as contended by
24 Wave, the limitations of the only asserted claim, Claim 39, do not.

25 The Court finds that Claim 39 is directed to a natural phenomenon: that the repetitive
26 application of a magnetic field to the intrinsic frequency of a subject's brain will alter its
27 frequency.
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1 Having determined that the claim is directed to ineligible subject matter, the Court
2 next considers whether the limitations of Claim 39 involve more than performance of well
3 understood, routine and conventional activities previously known to a person of skill in the
4 relevant field at the time the patent was filed. *Berkheimer*, 881 F.3d at 1367.

5 Here there are material facts in dispute. Wave's expert represents that although TMS
6 devices and rTMS were known at the time of invention, it was not routine to first identify
7 using an EEG, the intrinsic frequency of the patient's brain and then pre-select a target
8 frequency goal for the adjustment, thereby customizing the treatment. [*See, e.g.*, Decl. of
9 Dr. Marom Biksom, Doc. No. 216-3 ¶ 35.] Patients at the time of the claimed invention
10 were subjected to TMS treatment at a fixed frequency. Wave asserts that this limitation of
11 determining the patient's intrinsic frequency and then having the TMS device repetitively
12 fire the magnetic field to get to the pre-selected targeted frequency was not a routine or
13 conventional activity and provides patentable inventive concept.

14 Peaklogic disagrees. This factual dispute over what was conventional activity in this
15 field involving the use of TMS devices and rTMS to adjust brain frequencies at the time of
16 the invention and whether pre-selecting a target frequency amounts to inventive concept
17 precludes summary judgment.

18 Peaklogic's motion for summary judgment of patent ineligibility as to Claim 39 of
19 the '354 patent is therefore DENIED.

20 **III. Claim 1 of the '259 Patent**

21 The only asserted claim of the '259 Patent is independent Claim 1. A method claim,
22 it claims the steps of (1) generating output of a magnetic field based on an intrinsic
23 frequency of a specified EEG band of a subject, (2) generating the magnetic field having a
24 first frequency that is higher than the intrinsic frequency in the specified EEG band of the
25 subject in order to move the intrinsic frequency of the subject up within the specified EEG
26 band toward a preselected intrinsic frequency, or (3) generating the magnetic field having
27 a second frequency that is lower than the intrinsic frequency in the specified EEG band of
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1 the subject in order to move the intrinsic frequency of the subject down within the specified
2 EEG band toward a preselected intrinsic frequency.

3 The final step is applying the magnetic output to the head of the subject, to improve
4 at least one of “neuropathic pain in the subject, a neurological disorder in the subject, a
5 symptom of brain damage, and brain dysfunction” in the subject.

6 The Court finds that this claim too is directed to the natural phenomenon that a
7 brain’s inherent electrical frequency can be altered by exposure to a magnetic field of a
8 different higher or lower frequency. This claim has even less specifics than Claim 39 of
9 the ‘354 patent. Other than claiming an EEG is used to determine the intrinsic frequency
10 of the subject’s brain, a known and conventional use of an EEG, there are no limitations as
11 to how a magnetic field of a higher or lower frequency is selected, generated, or applied to
12 the subject’s head.

13 The claimed method includes no limitations in terms of how to move the intrinsic
14 frequency such that it will alter the patient’s brain to achieve one of the claimed potential
15 results. *C.f. Vanda Pharms.*, 887 F.3d at 1135 (including claim limitations of specific
16 dosages was significant to finding a new way of using an existing drug was not merely
17 directed to a law of nature.) The steps of the method do not limit the claim to any particular
18 application or provide any limitations as to how to obtain the claimed improvements.

19 If a [natural phenomenon] is not patentable, then neither is a process reciting [a
20 natural phenomenon], unless that process has additional features that provide
21 practical assurance that the process is more than a drafting effort designed to
22 monopolize the [natural phenomenon] itself.

23 *Mayo*, 566 U.S. at 77.

24 This method claim instructs that application of an external magnetic field of a
25 frequency different than the patient’s intrinsic frequency will move that intrinsic frequency.
26 It instructs a practitioner that applying an undefined higher or lower magnetic field may
27 achieve improvements in brain function of the patient but provides no parameters as to how
28 to achieve that result. Therefore, selecting and generating any magnetic field by any means

1 that is higher or lower to any degree than the patient's inherent frequency and applying it
2 to the head of the patient by any means, if it results in some unquantified improvement in
3 the patient's brain function, would be covered by this method claim. The Court finds this
4 claimed method describes nothing more than the natural phenomenon that a brain's
5 intrinsic frequency can be altered by external stimuli and provides no significant instruction
6 beyond claiming that it can be implemented to treat a patient with a brain disorder.

7 The Court further finds in the context of this claim, there is no inventive concept
8 disclosed in the method. The steps simply tell a practitioner to determine the patient's
9 intrinsic frequency, determine a magnetic field of a higher or lower frequency and then
10 apply it. The claimed result that it will improve a patient's brain function may be the
11 natural result of altering the patient's brain frequency, but the claim provides no particular
12 formula or instruction to achieve the result. The claim is overly broad, and the Court finds
13 it claims ineligible subject matter and is invalid.

14 Peaklogic's motion for summary judgment of patent ineligibility as to Claim 1 of
15 the '259 patent is therefore GRANTED.

16 **IV. The Asserted Claims of the '554 Patent**

17 Wave asserts independent Claims 1 and 4 of the '554 Patent, dependent Claims 7
18 and 8, thereby also asserting independent Claims 2 and 5 from which they depend, and
19 Claim 11 which asserts Claims 2, 5, and 10 from which it depends.

20 These are all method claims. The Court's analysis of Claims 1 and 4 have the same
21 deficiencies as Claim 1 of the '259 patent. They claim methods for treating depression that
22 have the steps of determining the subject's intrinsic frequency or EEG phase, another way
23 of expressing the inherent electrical frequency of the subject's brain, selecting a different
24 frequency or phase and applying the output of a magnetic field to the subject's head to
25 move the intrinsic frequency or phase to the selected frequency or phase.

26 As a method to treat depression, the claims include no limitations in terms of how to
27 move the intrinsic frequency or phase such that it will treat a subject's depression. These
28 claims instruct at a very high level the application of an external magnetic field to the head

1 of the subject of a frequency or phase different than the patient's intrinsic frequency or
2 phase to move that intrinsic frequency or phase. There is no limitation or specifics
3 regarding the selection of a target frequency or phase, or the placement of the magnetic
4 field other than "close to the head of the subject" such that it will treat depression. The
5 Court finds these claimed methods describe nothing more than the natural phenomenon
6 that a brain's intrinsic frequency can be altered by external stimuli and provide no
7 significant instruction regarding how it can be implemented to treat a patient with
8 depression.

9 The Court further finds in the context of these claims, there is no inventive concept
10 disclosed in the methods. The steps simply tell a practitioner to determine the subject's
11 intrinsic frequency or phase, determine a different frequency or phase and adjust a
12 magnetic field to that alternative frequency or phase and then apply it. That the subject's
13 intrinsic frequency or phase will move in response to the external stimuli is a natural
14 physiological response. As a method to treat depression, the claims provide no particular
15 formula or instruction to achieve the result. The claims are overly broad, and the Court
16 finds they claim ineligible subject matter and are invalid.

17 Peaklogic's motion for summary judgment of patent ineligibility as to Claims 1 and
18 4 of the '554 patent is therefore GRANTED.

19 Independent Claims 2 and 5 fare no better. They claim the adjustment or tuning of
20 the subject's "Q-factor," another way of expressing the inherent electrical frequency of the
21 subject's brain, to treat depression. The steps of the claims are selecting a Q-factor
22 different from the intrinsic frequency of the subject's brain and applying the output of a
23 magnetic field close to the subject's head to move or tune down the Q-factor of the subject's
24 intrinsic frequency to that selected Q-factor as a treatment for depression. As with method
25 claims 1 and 4 these claimed methods describe nothing more than the natural phenomenon
26 that a brain's intrinsic frequency, expressed as a Q-factor, can be altered by external
27 stimuli, and provide no significant instruction regarding how it can be implemented to treat
28 a patient with depression.

1 Asserted dependent Claims 7 and 8 add nothing of significance as they simply direct
2 a practitioner to measure EEG data after applying the magnetic field and adjust the
3 magnetic field based on the results and apply it again.

4 Steps directing the measuring of results, adjusting and reapplying are routine,
5 conventional activities and insufficient to transform an unpatentable natural phenomenon
6 into a patent-eligible application. *Mayo*, 566 U.S. at 79.

7 Dependent Claim 11 incorporates the use of a permanent magnet for about 10 Gauss
8 to about 4 Tesla to generate the magnetic field employed in method Claims 2 or 5. The
9 Court finds this also adds nothing of significance to the deficiencies of Claims 2 and 5 to
10 claim patentable subject matter. The addition of this one parameter does not overcome the
11 overall lack of specificity in the method claims to conclude they do more than claim a
12 natural physiological response that the brain's electrical frequency will respond to external
13 magnetic stimuli.

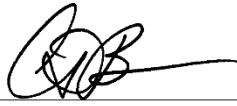
14 Peaklogic's motion for summary judgment of patent ineligibility as to Claims 7, 8
15 and 11 of the '554 patent is therefore GRANTED.

16 **V. Conclusion**

17 For the reasons detailed above, Peaklogic's motion for summary judgment of patent
18 ineligibility is **GRANTED** as to the asserted claims of the '259 and 554 Patents. The
19 motion is **DENIED** as to asserted Claim 39 of the '354 Patent.

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21 **IT IS SO ORDERED.**

22 Dated: October 7, 2024

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26 Hon. Cathy Ann Bencivengo
27 United States District Judge
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Appendix A

U.S. Patent No. 8,475,354 – Doc. No. 18-1

Claim 39. A device for use in treating a subject, comprising: a Transcranial Magnetic Stimulation (TMS) device comprising an electromagnet that generate a magnetic field;

a first processor that controls a repetitive firing of the magnetic field based on at least one of:

an intrinsic frequency of a brain of a subject within a specified Electroencephalography (EEG) band;

and

a Q-factor of the intrinsic frequency of the brain of the subject within the specified EEG band;

and wherein the first processor or a second processor moves

(a) an intrinsic frequency of the brain of the subject within the specified (EEG) band to a pre-selected intrinsic frequency within the specified EEG band using the magnetic field;

(b) a Q-factor of an intrinsic frequency of the brain of the subject within a specified EEG band toward a pre-selected Q-factor of the intrinsic frequency using the magnetic field;

(c) a coherence value of intrinsic frequencies among multiple sites in the brain of the subject within a specified EEG band using the magnetic field wherein if the coherence value is higher than a pre-selected coherence value, lowering the coherence value by applying at least two asynchronous magnetic fields close to the head of subject, and wherein if the coherence value is lower than the pre-selected value, raising the coherence value by applying at least one synchronized magnetic field close to the head of the subject;

(d) an EEG phase between two sites in the brain of the subject of a specified EEG frequency using the magnetic field wherein the magnetic field comprises a first magnetic field that is in-phase with a second magnetic field or a first magnetic field that is out of phase with the second magnetic field, or

(e) a combination thereof.

[‘354 Patent, Col. 62: 62- Col. 63:24.]

1 **U.S. Patent No. 9,446,259** – Doc. No. 18-3

2
3 **Claim 1.** A method comprising:

4 generating output of a magnetic field based on an intrinsic frequency of a specified EEG band of a
5 subject, a Q-factor of the intrinsic frequency within the specified EEG band of the subject, or both
6 comprising:

7 generating the magnetic field having a first frequency that is higher than the intrinsic frequency in the
8 specified EEG band of the subject in order to move the intrinsic frequency of the subject up within the
9 specified EEG band toward a preselected intrinsic frequency;

10 generating the magnetic field having a second frequency that is lower than the intrinsic frequency in the
11 specified EEG band of the subject in order to move the intrinsic frequency of the subject down within
12 the specified EEG band toward a preselected intrinsic frequency;

13 generating the magnetic field having a first pre-selected frequency in order to move the Q-factor of the
14 intrinsic frequency within the specified EEG band up toward a preselected Q-factor;

15 generating the magnetic field having a second pre-selected frequency in order to move the Q-factor of
16 the intrinsic frequency within the specified EEG band down toward a preselected Q-factor;

17 generating the magnetic field having a plurality of frequencies within the specified EEG band in order to
18 move the Q-factor of the intrinsic frequency within the specified EEG band down toward a preselected
19 Q-factor;

20 or a combination thereof;

21 applying the output of the magnetic field to a head of the subject, wherein application of the output of
22 the magnetic field improves at least one of

23 neuropathic pain in the subject,

24 a neurological disorder in the subject,

25 a symptom of brain damage, and

26 brain dysfunction in the subject.

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28 [‘259 Patent, Col. 95:41 – Col. 96:11.]

1 **U.S. Patent No. 8,480,554** – Doc. No. 18-2

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3 **Claim 1.** A method for treating depression in a subject having an intrinsic frequency in a specified EEG
4 band, comprising:

- 5 (a) adjusting output of a magnetic field based on the subject's intrinsic frequency;
6 (b) applying said magnetic field close to a head of the subject; and
7 (c) moving the intrinsic frequency toward a pre-selected intrinsic frequency within the specified EEG band.

8 *Claim 2. A method for treating depression in a subject, comprising:*

- 9 (a) *adjusting output of a magnetic field;*
10 (b) *applying said magnetic field close to a head of the subject; and*
11 (c) *moving a Q-factor of an intrinsic frequency within a specified EEG band of a brain of the subject toward a pre-selected Q-factor of the intrinsic frequency of the brain of the subject using the magnetic field.*

12 **Claim 4.** A method for treating depression in a subject having an EEG phase between a first site and a
13 second site in a brain of the subject of a specified EEG frequency, comprising:

- 14 (a) providing a pre-selected EEG phase of the specified EEG frequency;
15 (b) adjusting output of one or more magnetic fields and
16 (c) applying said one or more magnetic fields close to a head of the subject; and
17 (d) moving the EEG phase toward the pre-selected EEG phase using said one or more magnetic fields,

18 wherein the one or more magnetic field are of the same frequency and are in-phase with each other, out
19 of phase with each other, or a combination thereof.

20 *Claim 5. A method of treating depression in a subject, comprising tuning down the Q-factor of an*
21 *intrinsic frequency of a brain of the subject by applying a magnetic field close to a head of the subject,*
22 *wherein the magnetic field comprises at least one of (a) a single pre-selected frequency; (b) a plurality*
23 *of frequencies within a specified EEG band; and (c) an intrinsic frequency of the brain of the subject*
24 *within a specified EEG band.*

25 **Claim 7.** The method of any one of **claims 2 and 5**, further comprising the step of measuring EEG data
26 of the subject after the applying step.

27 **Claim 8.** The method of any one of **claims 2 and 5**, further comprising the steps of: adjusting
28 frequency of said magnetic field based on the EEG data of the subject; and repeating the applying step with an adjusted frequency.

1 *Claim 10. The method of any one of **claims 2 and 5**, wherein the magnetic field is generated by*
2 *movement of at least one permanent magnet.*

3 **Claim 11.** The method of **claim 10**, wherein the strength of the at least one permanent magnet is from
4 about 10 Gauss to about 4 Tesla.

5 [⁵554 Patent, Col. 58:24-40, 62-67; Col. 59:1-16, 20-26, 30-34.]
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